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PROMOTING BETTER GINNING PRACTICES BY APPLICATION OF RESULTS OF GINNING INVESTIGATIONS

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Good ginning practices involve not only the use of modern gin machine units but the employment of improved methods in their operation, and they have much to do with encouraging the adoption of methods of harvesting and handling cotton that contribute to higher quality ginned products. Care in these farm operations is as important as care in ginning. The ginner can render his best service only if and when the farmer uses all precautions in his work. But, under present day conditions, a gin must be modern and operated intelligently and in accordance with the improved practices in order to achieve the best possible results, and provide the service required of it.

Some Elements of a Modern Gin

A modern cotton-gin plant is fireproof, conveniently arranged inside and outside, and properly lighted and ventilated, either artificially or naturally. It has cleaning or extracting equipment suited to the needs of the community, and the gin stands are equipped with huller fronts for further cleaning of the cotton. Unit cleaner-extractor-feeders and huller-breasts are rapidly becoming standard equipment. It is very seldom that a gin needs to supplement this equipment with overhead cleaning machinery. Drying equipment also aids in cleaning trashy cotton; and in modern gins, provision is made for artificially drying green, damp or wet cotton. Over 800 of the cotton gins that operated last season were equipped with driers, and they handled about a million bales of cotton.

The gins now on the market are of a design that permits loose seed roll operation with a capacity of at least a bale per hour per 80-saw stand. Saw speeds of modern gins are 600 to 700 revolutions per minute as compared with about 400 revolutions per minute for many types of gins manufactured prior to 1930. The higher speeds contribute immensely to loose seed roll operation.

Seed is more economically moved a short distance by a conveyor than by a blowing system, although the latter has more advantages than the former in handling pure seed if clean air is used in place of the exhaust of unloading fans, which is usually contaminated with dust, dirt, and other impurities. Various means have been devised for keeping seed pure in gins handling improved varieties of cotton, including one-variety community gins.

Seed scales are becoming standard equipment for accurately weighing seed purchased from the farmer, and the modern gin has a convenient weather-proof hopper that drops the seed into the farmer's wagon. Both may be combined with a pure seed system of handling. Mechanical means for disposing of foreign matter at some distance from the plant are desirable. Modern gins also have adequate facilities for storage of bales where they will be protected against weather and fire. Shelter sheds protect wagon loads of cotton against rain. A seed-cotton storage house is arranged to provide for economically unloading seed cotton from wagons for storage and for transferring it from storage to the gin. Some of the newer cotton houses have ten sides instead of eight, and appear more convenient in arrangement.

Precautions to Follow in Cotton Gin Operation

Precautions to follow in the operation of a cotton gin can be divided into several general classifications. First, the cotton should be in the best condition possible before ginning and should not be too wet even if a drier is available nor should it be too trashy in spite of the fact that very fine and elaborate cleaning and extracting machinery is on the market. Present day drying, cleaning and extracting equipment is not effective enough to put roughly harvested, trashy, or wet cotton in a condition that it will gin out a sample equal in quality to that ginned from clean cotton, handpicked under dry conditions. This type of machinery, however, has gone a long way toward preserving and improving the quality of American cotton.

In operating a cotton drier, assurance must be had that there is an adequate volume of air, and close attention must be given to the drying air temperature. For the usual run of damp or wet cotton, the drying temperature should not exceed 160° F. A slightly higher temperature can be used with very wet cotton but under no circumstances should it exceed 200° F. High temperature "bakes" the cotton, weakens the fiber strength, and injures the spinning quality. It is seldom advisable to pick cotton when it is actually wet, because even mechanical driers have difficulties in drying it. It is better to pass wet cotton through a drier twice at 150° F. than once at a temperature above 200° F., even though ginning is slowed down. Cotton should be fed no faster through the drier than the gin stands can handle it, just the same as it should be fed at a moderate rate to cleaners and extractors to get efficient results.

The next important element involved in good ginning is the factor of seed roll density. Loose seed roll operation is essential, even with the dry short staple cottons if smooth and superior preparation is to be obtained. There are a number of factors that influence seed roll density. Naturally the first to come to our mind is the matter of feeding any gin of any type or condition beyond its normal capacity, and this is about the only cause of dense roll operation with the newer designs of gins, while

with the older gins that operate with slow saw speeds, and have been neglected so far as repairs of vital parts are concerned, satisfactory capacity can be attained only with dense seed roll operation, which causes rough preparation. Pre-ginning in the huller fronts may also result from heavy feeding. If the saws have been neglected and are dull or badly worn, they will not be efficient in removing the lint from the seed. The result will be denser seed rolls and "napping", or poor preparation of the lint. Similarly, inadequate doffing of the lint from the saws because of badly worn or improperly adjusted brushes in brush gins, or because of a run-down air-blast system in air-blast gins, will produce tighter seed rolls at a given rate of feed than with efficient doffing mechanisms. A seed board too nearly closed or with lengthy spikes will prevent easy discharge of the seed from the roll box which in turn will hinder loose seed-roll performance. Feeders are sometimes operated at such a high speed that the lowest feed-setting provides too much cotton for loose seed-roll ginning.

Other precautions to follow in operating the gin stands themselves are to see that the vital parts are properly adjusted or set right for the particular kind of cotton being ginned. Proceeding with the route of the cotton through the gin, the picker rollers or hullers should be adjusted with each change in foreign matter content of the cotton as the season advances and rough cotton is encountered, being set further away from the saws as the cotton becomes rougher. The seed board setting is directly related to the size of the seed of the cotton being ginned, being wider open with the larger and fuzzier seeded cotton. Seed rolls should be dumped periodically to get rid of accumulated foreign matter that causes two-sided bales when clean cotton is subsequently ginned with them. Mote boards or control dampers should be opened up enough to allow the motes to be expelled without taking usable fiber with them. Dividing boards and wind boards are important items to maintain in brush gins. Brushes should be so set in relation to the saw that the bristles lap the saws the full depth of the teeth and should be operated only at speeds that will remove all of the lint from the teeth and at the same time create enough air to convey it to the condenser. Air-blast pressure can be varied by a slide or cone valve on the intake of the fan, higher pressure being required as the moisture content of the cotton increases.

The lint flue air diversion valve should be set to give a uniform bat of lint from the condenser. There should be an adequate discharge of the air from the condenser to prevent back lash of the gins and irregular lint bats. The speed of the condenser should be slow enough to provide a fairly thick bat of lint to the press. To suit the condition of the cotton, the lint kicker speed should be varied or its position adjusted, and the lint slide position varied, the damper cottons requiring faster speed, or forward or lower adjustment of the kicker or higher position of the lint slide than the drier cottons. Attention to the units from lint flue to the press should go a long way toward preventing big-ended and big-sided or rolling bales, and the cutting of them at compresses.

Knowledge of Cotton Quality by Growers and Ginners Essential to Good Ginning

In view of the many ginning factors that may influence the quality of the ginned products, as well as the prevailing methods of harvesting and hand-

ling, as heretofore outlined, it is evident that cotton ginners and farmers would be in a better position to know how and when to improve the operations that influence quality if they knew more about the elements that make up quality. If they have access to a detailed classification of the cotton concurrently as it is ginned, and were in the position to interpret it, they should be just as well off as if they were skilled cotton classers.

Factors of Quality Influenced by Ginning and Associated Processes

Staple length is seldom influenced in the ginning processes. The only ginning operations that affect fiber length, are (1) those which increase the gin turnout materially as compared to standard ginning, and (2) over drying of cotton at the gin. Sometimes, the staple length is penalized on account of the sample being of very rough and "nappy" preparation, but a sample of cotton must be badly gin-cut and reduced about 3 grades before the fibers are actually cut, and their breakage determined by fiber arrays. It would take at least an hour to gin this kind of cotton on the average 3- or 4-stand gin, and it would have to be wringing wet cotton to begin with.

Preparation is the principal quality element affected by ginning. It is by definition a function of the ginning process rather than an inherent quality of the seed cotton, although the characteristics and properties of seed cotton play an important part. Preparation designations are not only influenced by "nappiness" of the lint, but by "neppiness", stringiness, roughness and motiness. "Nappy" lint naturally is associated with the ginning of seed cotton in a green, damp or wet condition and with ginning with dense seed rolls, the causes of the latter of which have already been enumerated. Occasionally roughness in the lint may come from immaturity and motiness of the locks. "Neppiness", very small tangles of fibers, is frequently associated with immaturity of fiber.

Leaf content can be influenced by the preparatory processes of ginning, but little can be done in the way of ginning to affect the actual fiber color of lint. Sometimes soil spots and boll weevil damage can be broken up by extracting machinery. Obviously these are problems to be handled by the producer and not the ginner.

Some Problems in Correcting Faulty Ginning

It should be understood that even if a detailed classification is available to the ginner, or if he is in the position to appraise the quality of the sample, the problem of tracing the cause of gin damage is not always a simple one. That is, if the classification of the sample shows gin damage, the underlying faults in the cotton or in the machinery or in its operation cannot be determined instantly. Further observation, coupled with tests made in the gin, are usually necessary to get at the root of the difficulty.

The U. S. Cotton Ginning Laboratories have prepared and released Leaflet 169, "Preventing Gin Damage to Cotton" which outlines a procedure that has been found to be effective in determining the cause or causes of rough ginning.

Briefly, it gives the steps to take in ascertaining whether the source of damage is the cotton or the machinery. If it is found to be in the cotton,

the problem is simple, generally requiring some method of drying, or better still, care in harvesting, to cope with it. If it is in the machinery or the method of operation, some very careful tests and observations are required.

Of course, the first thing to check in gin operation is the seed roll. If the rolls are too dense, the factor or factors responsible must be determined. This involves the checking of items, in the order of importance somewhat as follows: Condition and setting of gin saws, ribs, brushes, and air-blast system; brush speed and air-blast pressure; speed of gin saws; settings of seed, mote, and dividing boards; speed of feeders; and condition and settings of cleaning and huller devices, lint flue, and condenser.

Along with revealing gin damage, a classification of samples drawn from two sides of a bale will indicate non-uniformity in quality of a bale of cotton, and information of this type is helpful to the ginner in reducing the number of two-sided bales. Such bales usually are the result of carelessness on the part of either the grower or ginner. If the grower's load of seed cotton is partly damp and partly dry or contains cotton of more than one variety or is otherwise mixed, it is inevitable that the bale of ginned lint will not be uniform in quality. If, on the other hand, the grower has taken every precaution to provide a uniform product in his load of seed cotton, practices on the part of the ginner may result in a non-uniform pack in the bale of lint. This may result from allowing cotton from the previous bale to be carried over into the new bale or from other practices in the operation of the gin equipment which delivers to the gin press-box a non-uniform product.

There is one other problem that ginners are, no doubt, encountering. The gins in the newly organized one-variety community growing 1-1/32 inches and better staple have been accustomed previously to ginning short cotton, which gins out a much smoother and cleaner sample than the longer staple cotton handled under similar conditions. The grower should be impressed with the fact that the longer staple cotton must be picked cleaner and delivered to the gin in a drier condition than the short staple cotton. It must fall in the better grade classifications in the end, if the grower is to find its production a profitable venture. Ginners have to modify their methods of operation, and in some cases even install new equipment to properly gin long staple cotton which requires more care in ginning than short staple cotton.

In conclusion, I wish to remind you that the U. S. Cotton Ginning Laboratories at Stoneville, Mississippi, are open to visitors, and a cordial welcome is extended at all times to growers, ginners, and other interested parties of Arkansas and the entire Cotton Belt.